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6 April 1982

Worldwide Report

ENVIRONMENTAL QUALITY

(FOUO 3/82)

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GERMAN DEMOCRATIC REPUBLIC

WIDESPREAD POLLUTION PROBLEMS SEEN THREATENING GDR

Hamburg STERN in German Vol 35 No 6, 4 Feb 82 pp 58-62

[Report by Dieter Bub: "The Mess From Over There: In the GDR Hardly Anything Is Done for Environmental Protection. Water and Air Are Heavily Burdened With Industrial Toxicants. Via the Elbe and Werra Rivers, the Pollution Enters Also the Federal Republic"]

[Text] When evening falls on the socialist German fatherland, thick clouds darken the sky between Rostock and Karl-Marx-Stadt. In factories and power plants the filter systems are shut off. From the smokestacks sulfur-yellow, brown, gray and black wisps rise up--smoke signals of an industrial state in which fulfilling the plan has priority over environmental protection. That which stinks to high heaven in East Germany and bubbles in the rivers can always be measured by the toxicants in the West.

On paper environmental protection in the GDR is guaranteed. In 1963 a water management law was passed, in 1970 a law concerning the plan-based development of socialist environmental control. There is a Ministry for Environmental Protection and Water Management. In the bezirks "standing commissions" meet to which experts are appointed. Everywhere in the country honorary helpers are going around who are supposed to prevent damage and catch little sinners.

But the big ones are allowed to get away. The environmental control law, in elastic clauses, provides for keeping the air clean and combatting noise--to be sure only following the "social requirements" of production. The authors were obviously of the opinion, which has been propagated for years, that environmental pollution is typical only of capitalism, but in the socialist social order is "alien to the system."

The GDR has its environmental scandals just as the FRG does. The inhabitants of Hettstedt near Halle were exposed for decades to a by far stronger lead poison than the citizens in Goslar in the FRG. Yet no one heard anything about it. Even today the fact is concealed that after shutting down the lead refining plant vegetables and crops still contain too much lead.

In Blankenstein so much unpurified waste water was fed into the Saale reservoirs from the previously private and then state cellulose paper factory that in 1977 the water "flipped:" Above the river hydrogen sulfide flared,

shipping had to be stopped, a part of the population had to be temporarily evacuated. Only with the use of water aeration units was it possible to avert the danger. Only after that did the state authorize the money for the construction of a clarification plant.

Even today the Buna Chemical Works feeds between 45 and 90 kg of poisonous cyanide into the Saale River every hour. After rowers of the "Halle Chemistry" sport club fainted during training, air measurements in the region of the Wehre River in the city area of Halle exceeded by 50 times the usual internationally accepted maximum emission values for residential areas.

The alarmed GDR Council of Ministers resolved to expand quickly the Buna clarification plant by the end of 1980. Since then the project has been postponed by at least 2 years.

Of course, the top athletes of "Halle Chemistry" no longer have to train on the filthy waste water from the factories, but the children of the enterprise sport clubs "Empor" and "Turbine" continue to be sent onto the polluted river in spite of warnings by doctors and scientists. Along the bank you can rent rowboats for a boat outing, and at the Giebichenstein bridge across from the "Pitcher at the Sign of the Green Wreath," a restaurant catering to excursions, the steamers of the "White Fleet" depart in the direction of Bernburg on the dead black river.

In 1971, the office of the head river master put forth a program for keeping the Saale River clean and it was passed by the chief bezirk authority. The chief mayor of Halle promised for 1975 new swimming pleasures on the banks of the Saale River. If he were to venture into the river today, he would have to figure on heavy damage to his health. The grand plans have long since been filed.

The Mulde River is also totally polluted. The river in Saxony is turning into a sewer because of the largest crop pesticide producer in the GDR, the Bitterfeld Chemical Combine. Every day 120,000 cubic meters of chemical waste water are fed into the river through a feeder and a canal.

In addition, organically polluted waste water comes from the Wolfen Photochemical Combine. The Mulde River is so heavily polluted that in a test, in which the river water was diluted 20 times, half the fish in it perished.

Axel-Thomas Lilie, former manager of the state water inspectorate in Halle Bezirk who lives in the West today, explained to the STERN that the GDR, in the 33 years since its establishemnt, had transformed once clean rivers into waste water sewers:

--the Wipper and Werra Rivers in Thuringia are brine canals;
--the Saale River, in the region of the Bleiloch reservoir, is a gigantic quagmire which stinks of hydrogen sulfide and from Leuna on is black slop;
--the Parthe and Weisse Elster Rivers have turned into black foaming phenol rivers;
--the Mulde River, from Bitterfeld on, is like a poisonous sewer pipe.

Not only the water, the air, too, is polluted. When in summer 1981 the moving van drove up in front of an apartment building in Merseburg 2, housewife Gisela H. [name known to the editor] breathed a sigh of relief. She was moving with her family to Schwerin and in this way was escaping the constant cloud of poison from the neighboring Leuna works. For years her two children had suffered from severe respiratory problems. Medical treatment brought only temporary relief. Chronic bronchitis occurs in the Halle Bezirk two and one-half times more frequently than in Neubrandenburg Bezirk.

On the average, life expectancy here is 5 years less than in the rest of the GDR. There are one-fourth more cancer cases and 10 to 15 percent more heart and circulatory diseases. A ward physician confirmed for the STERN: "Whoever lives in Halle and the environs lives an unhealthy life and a shorter one."

In Leipzig, Karl-Marx-Stadt and Berlin, too, breathing is unhealthy. In addition to the industrial exhaust gases, the clouds of smoke from the home heaters which use brown coal briquets pollute the air. Besides dust and ash, every year four to five million tons of sulfur dioxide rain down on the GDR (by way of comparison: every year 3.5 million tons of sulfur dioxide fall on the FRG which is two and one-half times as big). The forests of the Oberlausitz and the Erzgebirge are dying. In the vicinity of the "Schwarze Pumpe" Brown Coal Combine in the Cottbus Bezirk, which processes 100,000 tons of crude brown coal every day, in an area of 40 hectares only one-fifth of all the trees is healthy and more than 10 percent of the stands of forest are totally destroyed.

There is no money for expensive air filter systems which would have to be imported from the West. Air pollution over the large cities becomes critical in the winter months. When during the heating season smoke, cold and increased air humidity come together and the exhaust gases in a weather inversion situation cannot move away for days, then, for example, Berlin threatens to suffocate under a layer of smog. Just in the past 2 months in the western part of the city there were three smog alarms. The magistrate of East Berlin did not report any special occurrences.

In addition to the chemical industry and brown coal, agriculture is the third large environmental polluter in the GDR. The use of large areas in the cooperative and the mass keeping of cattle in the combines resulted in severe pollution of the soil and ground water. For higher harvest yields entire tracts of land are covered with fertilizer, agricultural pilots spray insecticides which the rain washes into the brooks. The consequences can still be detected in the Baltic Sea. Fishermen on Ruegen complained to STERN: "This poison is not only destroying the vermin. It is also making the fish sick for us. More and more have sores." In 1980 the authorities had to admit to a large scale death of eels. Consumption was forbidden.

In order to save construction material, large stalls were built which did not have adequate facilities for removing manure. Thus, in the Seegrehna Cattle Breeding Plant in Wittenberg kreis, for example, the kreis and bezirk councils had to authorize putting 5,000 cubic meters of liquid manure into the Elbe River. In Berlstedt large cattle facilities pollute two streams and the

ground water. In Trannroda near Weimar leakage from a green fodder silo got into the soil and made the drinking water brackish for the city of Kranichfeld. A new water pipe cost M1.7 million.

Water is scarce. GDR Minister for Environmental Protection Hans Reichelt explained at the end of November that by 1985 industrial consumption must be lowered by one-fourth. Only 6.3 percent of the waters are considered "clean." With 260 milligrams per liter the nitrate content in individual regions exceeds the GDR's highest possible value of 40 milligrams by an amount that is six and one-half times greater. For adults this means increased danger of cancer, and babies are threatened by a severe blood disease (cyanosis). Thus, in 1980 in the GDR 12,000 small children had to be supplied with mineral water. The number will rise rapidly in the future according to estimates by experts.

The GDR youth journal FORUM established the following: "At present, out of economic and political necessities, it is not possible to solve in a comprehensive way the contradiction between the necessary efficiency of the economy and the essential environmental protection."

Even if large demonstrations are not possible in the GDR, such as those in the FRG against Frankfurt's west runway or the nuclear storage site of Gorleben, there is nonetheless still opposition to the unquestioning belief in socialist progress.

The Protestant church in the GDR is demanding a radical reorientation. Erfurt theologian Heino Falcke explains: "Basically the issue is that we have come to the limits of how much nature can be polluted, that under the perfected domination by man nature is threatening to breathe out its last."

In November 1979 the national synod of the Protestant church in Mecklenburg demanded public discussion of the opportunities and dangers of the peaceful use of nuclear energy. Up to then the topic was taboo. The GDR built its five nuclear reactors without complicated licensing procedures. The same is true of the three nuclear power plants that are under construction. There were and are neither citizens' initiatives nor demonstrations against the building of the nuclear power plants of the Soviet type "Novo-Voronesh," whose safety equipment is considered by Western experts to be inadequate. They do not have a costly emergency cooling system as is prescribed in Western countries, and their protection against cracking is insufficient. A sport plane crashing on the factory can result in a catastrophe.

Not only theologians and church newspapers increasingly draw attention to the dangers for the environment, even GDR journalists, usually worldmasters at concealing defects in the "developed socialist society," in the meantime are showing spirit for environmental protection. Thus, the LEIPZIGER VOLKSZEITUNG In October 1980 reported: "Everyone knows that the large enterprise in Boehlen is not exactly dumping perfume into the Pleisse River." In 1979 the chemical factory had to pay a fine of M33,000 per day for polluting this river.

The SED paper mentioned a second example: "For years the Electroplating Plant VEB, Leipzig, has been draining waste water with an illegally high concentration of pollutant from its grounds." Commentary by the technical director: "We have not yet solved the problem technically." The LEIPZIGER VOLKSZEITUNG admonishes all GDR industy: "More can be done. Roughly one-third of the environmental pollution could be avoided immediately, for it is encumbered with subjective failure: negligence, carelessness, slovenliness. This does not concern available electric filters on power plant chimneys, waste water clarification plants, which in the purest sense of the word let everything pass by, or even vehicles which in an uncontrolled way puff diesel and gasoline gases into the air."

With the establishment of the "Nature and Environment" society in the GDR Cultural League, the attempt was made to calm the people. Some 1,600 working groups are organized in it. According to the resolution of the Ninth Congress of the Cultural League in 1977 they are supposed to preserve nature as the source of life, material wealth, health and pleasure and utilize it in accordance with scientific findings.

"Nature as the source of life" has meanwhile been largely ruined in the GDR--as in the industrial countries of the West. The FRG also has this damage. A large part of the toxic waste water is washed into the west of Germany. When the Elbe River at Schankenburg leaves the GDR, it has long since been a stinking river to which industry in Hamburg then gives the death blow. And every day the Werra River moves 30,000 tons of salt from the potash combines of the GDR to the FRG. The amount of salt, with 40 grams per liter, is twice as high as in the North Sea.

In seven discussions to date between Bonn and East Berlin experts have discussed the various possibilities for eliminating the salt in a different way. There is talk of a dry separation process with which a large part of the salt could be filtered out in the GDR. That would cost M200 million. And then there is the plan for a waste water pipeline from the Werra River to the North Sea. The project would come to M2 billion. Because the GDR does not want to finance the salt removal, the one process or the other would only be put into action if the FRG would assume the costs. But at present there is no money for that in the Bonn state treasury.

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NEW FOUNDATION TO FIGHT HABITAT DESTRUCTION

London NEW AFRICAN in English No 172, Jan 82 p 94

[Article by Jimoh Omo-Fadaka]

[Text] THE NIGERIAN Conservation Foundation, which became operative on October 1 1981 in Lagos, promises to be the basis of a quiet revolution in conservation in Nigeria. It may make conservation an important political influence in the management of the country's resources. It could also provide a positive and constructive input into planning and environmental protection in Nigeria. The Foundation will be officially launched with a banquet in February 1982 in Lagos.

The trustees of the Foundation are three well-known and respected Nigerian businessmen, Chief S.L. Edu, Mr A. Guobadia, Mr A. Leventis, and one of the most influential women in Nigeria, Miss Aduke Moore. The director of the Foundation is Mr Olayinka Fisher, a former Nigerian diplomat in the Nigerian Foreign Service.

The word "conservation" means different things to different people. It is the preservation of wildlife, the continued utilisation of natural resources or the prevention of irreparable damage to the environment. According to Chief Edu, Chairman of the Board of Trustees of the Foundation, "conservation should attempt to ensure sustainable utilisation of nature and natural resources including wildlife. As development raises the standard of living, conservation attempts to guarantee the long-term benefits of development. Both processes are therefore complementary."

Although much attention is focused on development, Chief Edu feels very strongly that serious thought should also be given to conservation. According to Chief Edu, "80 per cent of animal protein consumption in the rural areas of Nigeria is obtained from 'bushmeat'. There is an urgent need to guarantee the source on a sustained yield basis".

He adds that "There is also the need for continuous utilisation of firewood as fuel. Our fishery industry is being crippled by pollutants and the destruction of breeding areas. Our National Parks need to be properly structured and effectively run in order to provide recreation and the preservation of some of our natural heritage. The Foundation will attempt to complement government endeavours in these directions".

Thus the Nigerian Conservation Foundation will encourage Nigerians to be aware of the importance of conservation and the wise use of all the country's natural resources, including wildlife. The Foundation is a non-profit making and charitable organisation with office and staff in Lagos. It intends to:

- Raise public awareness on conservation matters. This will be achieved through the production of films, slides and educational materials for schools and the mass media. It will also organise public meetings and discussion groups.
- Encourage and fund research projects. Quite a number of beneficial conservation projects are being initiated by Nigerian and foreign scientists in Nigerian institutions of higher learning. Limitation of funds for such projects are often experienced. The Foundation will

support conservation research projects. ●Raise funds to carry out these activities.

The Foundation is an act of faith that these objectives can not only be attained, but be attained before the destruction and despoilation of the country's resources and landscape has progressed too far. Its activities will provide guidelines for the development of conservation policies and complement government efforts in this direction. The activities of the Foundation should produce pragmatic guidelines for a new, expanded concept of conservation and the maintenance of the quality of the country's environment for the benefit of present and future generations.

So rapidly is the Nigerian habitat deteriorating that the implementation of the Foundation's activities is a matter of urgency for the Nigerian government. The activities need sound scientific basis. They need a massive programme of education at all levels – from government to local level – since they will require basic changes in existing practices. They need political will to persuade the government and planners, again, at all levels from local to national, to be constantly aware of environmental implications.

The Foundation has close links with both the World Wildlife Fund (WWF), headquartered in Switzerland (of which H.R.H. Price Philip, Duke of Edinburgh is President) and WWF's sister organisation, the International Union for Conservation of Nature and Natural Resources (IUCN) also headquartered in Switzerland, with a world-wide network of resources and over 500 scientists, including some from Nigeria●

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BRIEFS

DROUGHT IN EASTERN PART--The AFP (French News Agency) recently announced in Kigali that a serious drought was affecting the eastern part of Rwanda at the time, along the Tanzanian border, and that the destruction of all the crops in the area had given rise to famine. The people in this region are said to have begun to flee because of lack of water. Almost all the rivers are dry. The search for water--usually left up to women and children--is now being carried on by men, who must sometimes travel more than 30 km on bicycles. Lake Cyohoha-Nord is said to be in danger of vanishing from the map. The water level has dropped more than 400 meters in places. Thousands of people dig for a little water in the mud left behind by the receding lake. The Revolutionary Movement for Development (MRND), Rwanda's only party, has asked the authorities to mobilize the country's food resources to cope with the famine. It has also appealed to foreign governments and organizations to furnish emergency aid to drought victims. Rwanda, with 200 inhabitants per square kilometer, is the most densely populated country in Africa. We recall that in order to lessen demographic pressure on the best land, the Kigali government has been promoting the settlement of the southeastern part of the country for several years, as this area was relatively sparsely populated. It is this region which is now suffering from the drought. [Text] [Paris MARCHES TROPICAUX ET MEDITERRANEENS in French No 1885, 25 Dec 81 p 3443] [COPYRIGHT: Rene Moreux et Cie Paris 1981] 9855

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ENVIRONMENTAL PROTECTION PROBLEMS IN NORTHWEST SIBERIAN GAS REGION EXAMINED

Moscow IZVESTIYA VYSSHIKH UCHEBNYKH ZAVEDENIY: NEFT' I GAZ in Russian No 7, 1981 pp 86-90

[Article by S. T. Bud'kov and A. N. Silin, Tyumen' State University: "Urgent Questions of Environmental Protection of Gas Recovery Areas in Northwest Siberia"]

[Text] The discovery of an oil and gas province in West Siberia has created favorable economic prerequisites for the formation of a powerful fuel and energy complex. An oil and gas extracting base has been set up here in a short time. The Tyumenskaya Oblast extracted 312 million T of oil in 1980, including gas condensate, and 156 billion m^3 of natural gas [1]. It is currently responsible for every second ton of oil and every third cubic meter of gas that is extracted in the country.

Potential natural gas resources in the Tyumenskaya Oblast are assessed at 75 trillion m^3 [2]. This will allow a gas-extracting region to be set up here in the future that will be unequalled in the world.

In the accountability report to the 26th CPSU Congress, the General Secretary of the CPSU Central Committee, Chairman of the Presdium of the USSR Supreme Soviet, L. I. Brezhnev stressed the uniqueness of the West Siberian fields. The decisions of the 26th CPSU Congress have outlined accelerated development of the West Siberian gas industry. Gas extraction here will reach 330-370 billion m^3 in 1985. This will be more than half of the national amount [1]. In this case the questions of environmental protection in the region will acquire even greater urgency.

With the intensive formation of the gas industry, one has to take into consideration that the natural landscapes of the Tyumen' north are in a very unstable equilibrium. This refers to the entire complex of man's environment: air and water basins, soil, depths, plant and animal world. Water of the northern surface reservoirs by itself is qualitatively worse than the water in the central belt of the European sector of the USSR: it is poorly mineralized, because of the low soil temperature and the lack of subsoil nutrition it contains little oxygen, it does not always have a pleasant taste, often has a swampy smell and brownish color since it comes from swampy territories. Oil is the most intensive water pollutant. One gram of petroleum products pollutes 100 liters of water and makes them unsuitable for consumption. Development of the West Siberian oil fields therefore requires careful observance of the measures that eliminate pollution of river waters of the Ob'-Irtysh basin

with oil and petroleum products. It is especially important to take this into account because the basin provides the country with 35% of the total catch of freshwater fish, and the rivers in the extreme north have considerably lower capacity for self-purification than normal [3]. Oil breaks down slowly, especially at low temperatures, and requires a large quantity of oxygen.

Specific environmental protection questions have to be resolved in the gas-extraction regions. This primarily refers to protection of water sources and the air basin. A completely closed cycle of water supply and drainage at the fields which eliminates discharge of industrial effluent into the reservoirs is the most promising. Such systems are still very expensive, however, therefore another method that can be suggested for temporary use is the discharge of waste water after prepurification in deep layers that are well screened and are not used for water supply needs.

The use of natural gas and its replacement of coal and oil makes significant and positive changes in the condition of the air basin. However, it is necessary to take into consideration that oxygen in the north is reproduced from a unit of area smaller than in the southern regions, consequently, the possibility of self-purification of the air is also lower. At the same time, many more wastes are discharged into the air in the northern regions because of the long duration of the heating season.

In order to prevent air pollution it is necessary to improve the gas field equipment, completely recover the gases and reprocess the components accompanying the gas. The most efficient method of controlling air pollution in the extreme north is the introduction of waste-free technology with a closed water supply cycle which increases the ecological capacity of the natural complex.

Air purity can also be guaranteed by intensive landscaping and preservation of the extant forest masses. It has been established at the same time that a natural process of retreat of the northern boundary of forests is occurring in the northern Tyumenskaya Oblast as a result of the swamping of the level sections. This leads to the growth of tundra-like territories and increase in the severity of the climate [4]. These natural processes are sometimes aggravated by man's thoughtless activity.

The regions of gas field development are characterized by great territorial scope of industrial construction. The extent of fields to be developed from north to south is: 90 km of Medvezh'ye and 180 of Urengoy. Over 500 km of roads, about 1000 km of gas pipeline loops and a field gas collector over 350 km long have to be laid on the Urengoy field alone. A multiple-branch system of trunk gas pipelines has to be made to transport the gas. A corridor 250-300 m wide has to be made for the entire route for even the minimum permissible convergence of a 32 m line for pipes 1420 mm in diameter. The width of the route for the gas pipelines can be significantly increased moreover, under the northern conditions because of the features of the territory's hydrography and other natural factors [5].

A large quantiy of lumber is being used to build log roads and create foundations for drilling units. The log roads are in use for 2-3 years, while the platforms under the boreholes with the cluster drilling method last an average of 60 days. Considerable volumes of lumber are consumed for these purposes. It has been established at the same time that construction of the foundations by hydraulic fill is less expensive and more reliable.

Since the interfluvial spaces are severely swamped, the agricultural crops are located near the young cities of the oil workers. In this case, the forest is chopped down and the lands near the river which usually slope towards the river are plowed up. This results in the development of intensive erosive processes that can convert the plowed fields into unproductive lands, cut with a dense network of ravines.

A characteristic feature of the gas regions of the Tyumen' north to be developed is the presence here of perennial permafrost which in the majority of cases is protected by a soil-vegetation layer, moss-peat cover and forest. The inevitable disruption of the protective cover (about 40 years are needed to restore the reindeer moss) during summer traffic changes the heat-exchange processes between the frozen ground and the atmosphere. Consequently, the frozen ground begins to thaw intensively. In an area where a tractor has passed 2-3 times, a muddy, thermokarstic-erosion gully with sinkholes and troughs can develop.

It is consequently necessary to provide for resolution of this problem when developing plans for transport movement in the gas regions of the north. There are numerous published suggestions that different promising types of transportation be used which preserve the natural conditions: dirigibles, monorail suspended road, trucks on an air cushion, etc.

The permafrost rocks are destroyed not only as a result of the use of tracked vehicles, but also in the construction of different field facilities and supply lines: wells, pipelines, etc. The artificially induced processes of freezing and thawing together with the exogenous permafrost-geological processes result in deformations in the diurnal surface, changes in the natural landscapes, complications in operating the facilities and deterioration in the living conditions of the people.

An example of the changes in the conditions of the environment caused by human activity is the condition of the Salekhard-Nadym railroad. Destruction of the plant cover, creation of structures, embankments and excavations and pollution along the road bed resulted in the development of heaving, sagging, thermokartstic lakes, and finally, the deformation of the slope which in certain places went under the water of the thermokarstic lakes [4,6]. The initial low cost in construction is considerably exceeded as a consequence of the expenditures for repair and restoration work. In addition, these roads have low passage capacity and the speed of the trains is slowed down on them. This affects the cost of the shipments. The average velocity on the Chum-Labytnangi railroad spur is 15-20 km. The route of the Alaskan railroad that was built in 1910-1923 when environmental protection regulations and standards were not observed now requires annual investment of $177,000 for repair operations. The road abounds in thermokarstic troughs and heaving knolls [7].

Man's economic activity not only affects the upper layers of the permafrost rocks, but also the deep layers located tens and hundreds of meters below the diurnal surface. Drilling wells promote redistribution of water in the rocks and the emergence of new hydraulic links. Penetrating to different depths in a short time, the underground and surface waters can cause considerable thawing of the frozen masses. These factors correspond in strength and rate of influence to natural processes occurring in the space of entire epochs.

The practice of developing the northern territories has made it possible to work out certain useful recommendations. The plans thus stipulate sand-gravel and rip-rap fills, high ventilated cellars and pile-supported foundations. The road fills are built with reinforced concrete slab pavements with drainage ditches, slope fortification and water passages. In high-temperature (sluggish) frozen ground and sandy ground, preconstruction thawing is used with subsequent packing of the ground with electric vibrators. Regulation of the snow accumulation processes has begun in order to direct the processes of freezing and thawing. The listed measures are not sufficient however. It is necessary to thoroughly study all the possible consequences that development of the northern gas territories could entail. There are still too few of these studies at the present time.

A detailed analysis is needed of the condition of the environment of the gas regions which will allow tracing of the ecological chains of its interaction with the processes of development and to pass to the development of substantiated predictions for the condition of the biosphere in different versions for the development of the gas industry, and in the final analysis, to the optimal plan which takes into consideration all the interrelationships of the biosocial system.

Different plans for preparing the gas for further transporting are now being simultaneously used at Medvezh'ye and other fields. They are distinguished by a varying degree of effect on the environment (volume of consumed water, degree of extraction of the condensate, set of structures, etc.). However, in design practice, a certain technology is often selected only based on economic criteria (in the majority of cases, the relative expenditures) without consideration for the ecological.

There is a varying degree of interaction between the natural and socio-economic subsystems in other ways of developing the gas fields (method of laying supply lines, transportation plan, water supply system, etc.). Consideration for the indicated interrelationships will allow selection of technological versions of gas extraction that are based on a system of predictions which must synthesize both standard and exploratory predictions for the condition of the environment.

The standard prediction of the biosphere begins with the detection of certain initial values of its parameters before the beginning of development. One can take as these initial values the parameters which are close to the natural. Further, with regard for the planned volumes of industrial development, a system is worked out for environmental protection measures which allows these initial parameters to be realized. This system can include the use of closed production cycles, construction of treatment works, and complete elimination of certain production processes. Then the technical and economic indicators are defined for the formulated measures (expenditures of different materials, underproduced products, etc.), and finally, the final parameters for economic development of the predicted system.

The consequences for the environment from the construction and functioning of the gas-extracting complex and its accompanying infrastructure can be divided into three groups: deep irreversible disorders in the geological and ecosystems as a result of construction of wells, roads and other facilities, new engineering and technical elements in nature; entrance into the environment of

gas, condensate and products of their combustion because of imperfection in either the technology or organization of gas extraction, or the equipment (accidents); possible unforeseen changes as a result of discharge of industrial effluent; disruption in the hydrological regime of rivers, etc.

The build-up of the Yamburgskiy, Zapolyarnyy and other gas fields is ahead. It is necessary to take into consideration the experience of the already developed territories, and based on an analysis of the effect of gas-industry structures on the environment, to formulate and realize a set of specific measures and technical means of preserving or artificially restoring the frozen conditions, to select the most favorable sections for construction sites, and to evaluate the effectiveness of the methods of engineering and biological recultivation. In the construction on age-old permafrost ground primary attention should be given to the engineering preparation of the territory, and formulation of a set of measures and engineering solutions that can be fulfilled in the preconstruction period or during construction [8].

It is necessary to consider that the nature of the north is extremely sensitive and easily damaged. Disorders in the permafrost zone are maintained for tens and hundreds of years, often adopting an irreversible nature.

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FEDERAL REPUBLIC OF GERMANY

AIR, WATER POLLUTED BY ILLEGAL POISON GAS PRODUCTION

Hamburg STERN in German 11 Feb 82 pp 132, 134

[Article by Rudolf Mueller: "Stored Death"]

[Text] "If something had happened," said a detective superintendant, "then we could have written off the southern part of Berlin." Prof Hans Bornowski from the Technical University verified the policeman's appraisal: "Just .02 mg per liter is a lethal dosage for humans." But it was not a matter of milligrams. There were 18 barrels with 5,860 kg. Berlin had its worst poisons scandal since World War II.

For 2 days the fire department had to remove broken and rusty barrels from a storage room in the Britz ward and pump the contents into new containers. After just a few attempts protected gloves were eaten away and compressed air breathing apparatus and suits to protect against acid were brought up as quickly as possible.

To be removed were waste products of the chemical Thiophosgen, "one of the most important poison gases," according to district attorney Lutz Waga. The chemical company "Ferak" had manufactured the poison gas in West Berlin. That is forbidden and according to the allied Control Council Law No 43, it can be "punishable by death." Company head Erich Ottemar Gruendemann, 52, accused by the district attorney's office of the production of war material, improper storage of toxic substances and environmental pollution, had his principal customer in Israel: the company "Plantex Limited" in Nathanya. In a year and a half the Israelis received 1,555 kg of Thiophosgen valued at DM 307,125. Gruendemann even wanted to gradually increase his production to 5 tons of poison gas annually. Neighbors of his production plants, however, complained of a stench in the air and brown apples in the surrounding allotment gardens, and alerted the health agency.

Again and again Gruendemann was able to put off authorities. As early as 1979 he received a reprimand from the senator for health and environmental protection on account of disorder on his industrial property--and he proceeded diligently as before. In the same year in the form of a poem he advised the agency that he had ordered a new smokestack for one of his factories.

Gruendemann was far less witty in other papers. "Thiophosgen is a dreadful chemical," he told his business partner in Israel in teletype message No

150-203/1058. The poison gas destroys the lungs and causes an excruciating death. "We are convinced that we are the only producers in the world," said another Telex. Such renowned chemical concerns as Bayer in Leverkusen and Merck in Darmstadt had ceased producing the gas for "environmental protection reasons." Gruendemann was not so scrupulous. The former chemistry student (12 semesters without a diploma) even sought additional orders from Israel: "We hope that you, too, will need Thiophosgen in the future."

The Israeli business partners sent barrels made out of a special alloy to Berlin for shipping, for Thiophosgen develops a high pressure within the containers. If a barrel were to burst the chemical and air would combine immediately to form a deadly gas. The dangerous freight traveled by rail from Ferak all the way across the GDR to Hamburg. From here it went by ship to Israel.

The manufacture of Thiophosgen results in tons of highly toxic wastes, especially Lost, which likewise serves as a poison gas. Forty barrels of the highly explosive wastes were stored in the yard of the Ferak plant on Germania Street, "in part with a make-shift temporary covering, and in part not at all protected from the effects of weather, next to a pile of rubbish" (according to the district attorney's office). Some barrels--contents: a highly toxic solvent--were even open. The investigators: "Gray vapors emanated, and there was a stench in the entire area."

According to an expert's opinion by the Technical University in Berlin, breathing the vapors causes "dizziness, headaches, nausea, vomiting, irritation of the conjuntiva and coughing." Another waste product from the manufacture of Thiophosgen may--even in the smallest quantities--cause "strong irritation to the eyes, throat, chest and mucous membranes." "In view of the improper storage," even with the leaking of a single barrel of lethal dosage "would almost certainly prevail in the air for a time."

According to the district attorney's office, in addition to Thiophosgen, Gruendemann has apparently also manufactured "at least 65 kg" of the poison gas Bromcyan. He may have had this poison manufactured on the first floor of his production plant on Germania Street. Wastes were conducted through a rainpipe directly into the Teltow Canal, where as a result numerous fish died. What happened to 1,700 grams of the highly toxic substance natrium cyanide, which results from the production of Bromcyan, is still unsolved. Prof Hans Bornowski: "This quantity is equivalent to a lethal dosage for 17,000 persons."

Company head Gruendemann has so far made no comments on the affair to the district attorney's office. To STERN he said: "We produce no poison gases. In Israel the Thiophosgen is used in producing a medication against athlete's foot.

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